

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:)	
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Ho-Suk KIM et al.)	Group Art Unit: 1795
)	
Application No.: 10/542,642)	Examiner: DAVIS, Patricia A.
)	
Filed: July 19, 2005)	
)	
For: SEALING STRUCTURE FOR)	Confirmation No.: 1718
POLYMER ELECTROLYTE FUEL)	
CELL)	

Attention: Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

APPEAL BRIEF UNDER BOARD RULE § 41.37

In support of the Notice of Appeal filed June 15, 2010, and further to 37 C.F.R.
41.37(a)(1), Appellants present this brief and enclose herewith the fee of \$540.00
required under 37 C.F.R. § 41.20(b)(2).

This Appeal responds to the final rejection of claims 1 and 3-10 mailed March 15,
2010.

If any additional fees are required or if the enclosed payment is insufficient,
Appellants request that the required fees be charged to Deposit Account 06-0916.

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I. Real Party In Interest

The real party in interest is FUELCELLPOWER Co., LTD., the assignee of record.

II. Related Appeals and Interferences

There are currently no other appeals or interferences, of which Appellants, Appellant's legal representative, or assignee are aware, that will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. Status Of Claims

Claims 1 and 3-12 are currently pending, of which claims 1 and 3-10 are under examination and claims 11 and 12 are withdrawn. Claim 2 was previously cancelled.

The final rejection of claims 1 and 3-10 is being appealed. A list of the claims on appeal is found in the attached Claims Appendix. Furthermore, each pending claim of this patent application is separately patentable, and upon issuance of a patent will be entitled to a separate presumption of validity under 35 U.S.C. § 282.

III. Status Of Amendments

No amendment was filed subsequent to the Final Office Action mailed on March 15, 2010.

V. Summary Of Claimed Subject Matter

Independent claim 1 is directed to a sealing structure for polymer electrolyte fuel cell having a membrane electrode assembly, which comprises: (1) a bipolar plate including a sealing groove and an anchor groove coupled to a periphery of the sealing groove, the sealing groove surrounding at least one of a reaction site or a manifold formed on the bipolar plate, the anchor groove extending toward an outer edge of the bipolar plate, and a width of the anchor groove being greater than a width of the sealing groove, (2) a sealing member formed of rubber and positioned in the sealing groove and the anchor groove, and (3) a gasket plate interposed between the bipolar plate and the membrane electrode assembly. The sealing member is formed by drying liquid rubber, the liquid rubber filling in the sealing groove by controlling a dispenser to start from the anchor groove and finish in the anchor groove by way of the sealing groove. See, for example, specification at page 9, line 4 to page 10, line 14, and page 10, line 19 to page 11, line 4; and Figs. 2-4.

VI. Grounds of Rejection

- A. Claims 1, 3-6, 9, and 10 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Schilling et al. (U.S. Patent No. 6,338,492, hereafter "Schilling").
- B. Claim 7 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Schilling in view of Sasaki et al. (U.S. Patent No. 6,337,120, hereafter "Sasaki").
- C. Claim 8 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Schilling in view of Sakumoto et al. (U.S. Publication No. 2002/0106954 A1, hereafter "Sakumoto").

VII. Arguments

A. Rejections Under 35 U.S.C. § 103(a)

Appellants respectfully traverse the rejection of claims 1, 3-6, 9, and 10 under 35 U.S.C. § 103(a) for at least the following reasons.

“The key to supporting any rejection under 35 U.S.C. 103 is the clear articulation of the reason(s) why the claimed invention would have been obvious. . . . [R]ejections on obviousness cannot be sustained with mere conclusory statements.” M.P.E.P. § 2142, 8th Ed., Rev. 7 (July 2008) (internal citation and inner quotation omitted). “In determining the differences between the prior art and the claims, the question under 35 U.S.C. 103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious.” M.P.E.P. § 2141.02(I) (emphases in original).

“[T]he framework for objective analysis for determining obviousness under 35 U.S.C. § 103 is stated in *Graham v. John Deere Co.*, 383 U.S. 1, 148 U.S.P.Q. 459 (1966). . . . The factual inquiries . . . [include determining the scope and content of the prior art and] . . . [a]scertaining the differences between the claimed invention and the prior art.” M.P.E.P. § 2141(II). “Office personnel must explain why the difference(s) between the prior art and the claimed invention would have been obvious to one of ordinary skill in the art.” M.P.E.P. § 2141(III).

Claim 1 recites a sealing structure including “a bipolar plate including a sealing groove and an anchor groove coupled to a periphery of the sealing groove,” “a sealing member formed of rubber and positioned in the sealing groove and the anchor groove,” and “a gasket plate interposed between the bipolar plate and the membrane electrode”

assembly" (emphasis added). The claimed sealing structure, which is illustrated in Fig. 4, for example, includes a bipolar plate 100 having a sealing member, a membrane electrode assembly (MEA) 300, and a gasket plate 200 interposed between the bipolar plate 100 and the MEA 300. Thus, the claimed gasket plate is a plate which is placed between the bipolar plate 100 and the MEA 300. Sealing grooves 110 and 110' and the anchor groove 112 are formed on the bipolar plate 100, and these grooves are filled with a sealing member such as rubber. See Figs. 2 and 3 and their corresponding description in the specification.

Schilling discloses a fuel cell 1 which includes two bipolar plates 2 and 3 and an interposed MEA (membrane electrode assembly) 4. See col. 3, lines 41-43 and Fig. 1. Sealing elements 10 are inserted into grooves 9 of bipolar plates 2 and 3. See col. 3, lines 44-45 and Fig. 1. Sealing elements 10 are injected and are made of elastomeric material. See col. 3, lines 48-49 and 57-58.

Schilling also discloses a peripheral groove 9 filled with the sealing element 10. See col. 4, lines 3-6 and Figs. 3A-3B. Plugs 15 are formed in order to retain the sealing element 10 in blind holes 16. See col. 4, lines 7-8. That is, as shown in Fig. 3B of Schilling, plugs 15 are formed in blind holes 16, which are formed at the bottom of the peripheral grooves 9. By forming the plugs 15, the sealing element 10 in the peripheral grooves 9 is anchored to bipolar plate 2. See col. 4, lines 13-14. Thus, the plugs 15 appear to extend further into the bipolar plate 2, allowing the sealing element 10 to be anchored and kept from lifting or moving.

The Final Office Action alleged that Schilling teaches "a plug (gasket 15) interposed between said bipolar plate (2) and a membrane electrode assembly (MEA 4;

see figures 1 and 3B).” Final Office Action at page 2. Thus, the Final Office Action appears to allege that the plug 15, shown in Fig. 3B of Schilling, corresponds to the claimed “gasket plate” of claim 1, which is interposed between the bipolar plate and the membrane electrode assembly. The plug 15, however, is not a plate, but an extension of the sealing element 10 in the peripheral grooves 9 that extends further into the bipolar plate 2. Therefore, the plug 15 does not correspond to the claimed “gasket plate,” which is interposed between the bipolar plate and the membrane electrode assembly.

Furthermore, as illustrated in Fig. 1, the fuel cell of Schilling appears to include two bipolar plates 2 and 3 and the MEA 4 located between two bipolar plates 2 and 3, with the sealing element 10 disposed inside the grooves of the bipolar plates 2 and 3, but no element or structure is disposed between the MEA 4 and the bipolar plate 2 or 3. More specifically, the fuel cell disclosed by Schilling does not include any plate interposed between the MEA 4 and the bipolar plate 2 or 3.

Accordingly, Schilling fails to disclose or suggest, at least, “a gasket plate interposed between the bipolar plate and the membrane electrode assembly,” as recited in Appellants’ claim 1.

Claim 1 additionally recites “a bipolar plate including a sealing groove and an anchor groove coupled to a periphery of the sealing groove, . . . the anchor groove extending toward an outer edge of the bipolar plate.” Figs. 2 and 3 illustrate a bipolar plate 100 including a sealing groove 110 and an anchor groove 112. As shown in region A, the anchor groove 112, which is formed on the bipolar plate 100, is coupled to

a periphery of the sealing groove 110 and extends toward an outer edge of the bipolar plate 100.

The Final Office Action alleged that blind holes 16 and 18 of Schilling correspond to the claimed “anchor groove.” See Final Office Action at pages 2 and 8. This is not correct.

Schilling discloses that the blind holes 16 and 18 are formed at the bottom of the peripheral groove 9 and extend further into the bipolar plate 2. See Fig. 3B.

Specifically, the blind holes 16 appear to be formed into the bipolar plate 2 in a direction transverse to the plane of the bipolar plate 2, and the blind holes 18 appear to be formed into the bipolar plate 2 at an angle toward the center of the bipolar plate 2.

Schilling discloses that the blind holes 18 may be aligned diagonally with respect to the plate plane, and preferably be disposed in the angle center, as shown in Fig. 3B. See col. 4, lines 14-17. Thus, the blind holes 16 and 18 taught by Schilling appear to extend in a thickness direction of the bipolar plate 2, either directly into the plate or diagonally toward the center of the plate. However, the blind holes 16 and 18 do not extend toward an outer edge of the plate. Therefore, the blind holes 16 and 18 in Schilling do not correspond to the claimed “anchor groove,” which extend toward an outer edge of the bipolar plate.

Accordingly, Schilling fails to teach or suggest the claimed “anchor groove extending toward an outer edge of the bipolar plate,” as recited in claim 1.

For at least the above reasons, claim 1 should be allowable over Schilling. Claims 3-6, 9, and 10 depend directly or indirectly from base claim 1, and should be allowable at least due to their dependence from claim 1.

Appellants also respectfully traverse the rejection of claims 7 and 8 under 35 U.S.C. § 103(a) for at least the following reasons.

Sasaki was cited in the Final Office Action in connection with dependent claim 7 for allegedly teaching “a rubber silicon material for the sealing structure for the polymer electrolyte fuel cell.” Final Office Action at page 6. Sakumoto was cited in the Final Office Action in connection with dependent claim 8 for allegedly teaching a carbon gasket. Final Office Action at page 7. Even assuming that these references provide the teachings alleged by the Examiner, which Appellants do not concede, Sasaki and Sakumoto fail to overcome at least the above deficiencies of Schilling regarding claim 1, because they fail to teach or suggest “a gasket plate interposed between the bipolar plate and the membrane electrode assembly,” and “anchor groove extending toward an outer edge of the bipolar plate,” as recited in claim 1. Accordingly, claims 7 and 8 are allowable over the cited references at least due to their dependence from claim 1.

B. Conclusion

For the reasons given above, pending claims 1 and 3-10 are allowable over the applied references.


Therefore, Appellants respectfully request the Board to reverse the Examiner's rejections of claims 1 and 3-10.

To the extent any extension of time under 37 C.F.R. § 1.136 is required to obtain entry of this Appeal Brief, such extension is hereby respectfully requested. If there are any fees due under 37 C.F.R. §§ 1.16 or 1.17 which are not enclosed herewith, including any fees required for an extension of time under 37 C.F.R. § 1.136, please charge such fees to Deposit Account 06-0916.

Respectfully submitted,

FINNEGAN, HENDERSON, FARABOW,
GARRETT & DUNNER, L.L.P.

Dated: August 16, 2010

By: 
Selah Park
Reg. No. 57,127
(202) 408-4000

VIII. Claims Appendix to Appeal Brief Under Rule 41.37(c)(1)(viii)

1. (Previously Presented) A sealing structure for polymer electrolyte fuel cell having a membrane electrode assembly, the sealing structure comprising:

a bipolar plate including a sealing groove and an anchor groove coupled to a periphery of the sealing groove, the sealing groove surrounding at least one of a reaction site or a manifold formed on the bipolar plate, the anchor groove extending toward an outer edge of the bipolar plate, and a width of the anchor groove being greater than a width of the sealing groove;

a sealing member formed of rubber and positioned in the sealing groove and the anchor groove; and

a gasket plate interposed between the bipolar plate and the membrane electrode assembly, wherein the sealing member is formed by drying liquid rubber, the liquid rubber filling in the sealing groove by controlling a dispenser to start from the anchor groove and finish in the anchor groove by way of the sealing groove.

2. (Canceled)

3. (Previously Presented) The sealing structure as in claim 1, wherein the width of the anchor groove is 1.5 times greater than the width of the sealing groove.

4. (Previously Presented) The sealing structure as in claim 3, wherein a depth of the sealing groove is equal to a depth of the anchor groove.

5. (Previously Presented) The sealing structure as in claim 1, wherein the anchor groove is formed extending from the periphery of the sealing groove along a direction perpendicular to the periphery of the sealing groove.

6. (Previously Presented) The sealing structure as in claim 1, further comprising an opposed bipolar plate having an opposed anchor groove, wherein the bipolar plate and the opposed bipolar plate are disposed on opposite sides of the membrane electrode assembly.

7. (Previously Presented) The sealing structure as in claim 1, wherein the rubber comprises a rubber material containing at least one of silicon, fluorine, or olefin.

8. (Previously Presented) The sealing structure as in claim 1, wherein the gasket plate comprises the same material as the bipolar plate.

9. (Previously Presented) A polymer electrolyte fuel cell comprising said sealing structure stated in any of claims 1 and 3-8.

10. (Previously Presented) The sealing structure of claim 6, wherein the opposed anchor groove is formed on the opposed bipolar plate at a location symmetric with respect to the anchor groove of the bipolar plate.

11. (Withdrawn) A polymer electrolyte fuel cell comprising:

a plate comprising:

a sealing groove having a first portion and a second portion, the first portion surrounding at least one of a reaction site or a manifold formed on the plate, and the second portion extending from a periphery of the first portion toward an outer edge of the plate, the second portion having a width greater than a width of the first portion; and

a sealing member of soft elastic material formed in the sealing groove;

a membrane electrode assembly; and

a gasket interposed between the plate and the membrane electrode assembly.

12. (Withdrawn) A method for making a sealing plate for a polymer electrolyte fuel cell, comprising:

forming a sealing groove in the plate, the sealing groove:

having a first portion surrounding at least one of a reaction site or a manifold, and

having a second portion extending from a periphery of the first portion toward an outer edge of the sealing plate, the second portion having a width greater than a width of the first portion;

forming a sealing element of soft elastic sealing material into the sealing groove, comprising, sequentially:

dispersing the sealing material in liquid form into the second portion;

dispersing the sealing material in liquid form into the first portion; and

dispersing the sealing material in liquid form into the second portion, such that the sealing material is partially projected from a surface of the plate; and

converting the liquid sealing material into a solid form.